

## SECTION H - DRAWING LAYOUT AND SUMMARY

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## SECTION H - DRAWING LAYOUT AND SUMMARY

The end result of our design is to develop a set of construction drawings from which the structure can be built. In selecting the proper detail scales, the reproduction process to be used should be known in advance.

### I. REPRODUCTION PROCESS

Two methods of printing copies of the drawings are commonly used.

The most common method for small jobs where a limited number of prints are to be made is the ozalid process. No change in size from original to print is involved.

For larger jobs or where a greater number, 30 or more, copies are to be made a lithographic process is used. Printing presses for this process are limited in size, requiring a reduction in print size from the original normal "E" size drawing to a smaller "N" size.

The smaller scale drawings are used primarily for information to bidders while the larger drawings would be used for construction depending on the amount of detail on the drawing.

### II. DETAIL SIZE

The choice of scale used will depend on the reproduction process and complexity of the detail. Legibility and clarity are essential. In some cases a perspective or isometric view is advisable.

Legibility depends upon the reader's ability to distinguish the features and read the legend without visual difficulties. This ability varies among people depending upon experience and eyesight. Clarity, as opposed to legibility, is associated with understanding and depends on detail. Clarity varies more with the experience of the reader than with eyesight.

The drawings should be of a scale and detail to convey the idea to a builder with normal vision and experience commensurable with the complexity of the project. Keep in mind it is erroneous to assume a larger scale makes details easier to read and understand.

The above reasoning was used in establishing the scales to be used for the details in this manual. Steel schedules, stem splices and titles have been included in two scales where applicable; each consistent with the final reproduction process to be used.

### III. DRAWING DEVELOPMENT

Other than the standard drawings, preparation of the original

drawings for a particular job may be by one of two methods:

- (1) Details in the appropriate scale from this book may be traced directly on tracing paper in the arrangements as shown on Figures H-1 and H-2, or
- (2) A "mock up" of each construction drawing can be made by using detail sheets similar to those in this book, cutting out the appropriate parts and taping them directly to Bristol board in the suggested layout. If this process is used it should be done in the Cartographic Unit. From this "mock up" an 8" x 10" negative will be made and finally an "E" size film positive, which serves as the file copy. Chronoflex positives have a mat surface that will take pencil or ink if any changes or additions are to be made.

In either method, "fill-in" blanks and special details will require individual attention. Information regarding the component parts may be transmitted on sheets similar to Figures H-1 and H-2. The appropriate standard drawing or detail number should be listed in each block or completed summary sheets will provide more complete information to the draftsman. A sketch of special details should be included.

#### IV. SUMMARY SHEET

A summary form consisting of four pages with fill-in blanks has been developed to serve several needs. Properly filled in, the summary sheets will be a:

- (1) Convenient check list of information needed for development of the details.
- (2) Document the design decisions.
- (3) Concise form for transmittal of information to the draftsman for completion of the construction drawings.

Additional sheets should be added, as needed, to present the special details for the particular job.

Completed summary sheets have been included in the example illustration in this section, pages H-5 to H-8. Data entered on the sheets has been printed in red to distinguish the information that will vary from job to job. Sections that do not apply to the given job have been voided (by large cross) to simplify review.

## V. EXAMPLE

The problem from the previous sections has been extended for the 21" concrete pipe to show the completed reduced size drawing in Figures H-3, H-4 and H-5.

Figure H-3 is the standard inlet structure, Size H, completed for the 21" conduit.

Figure H-4 is made up of appurtenant details using the mosaic principle and a photographic process.

Figure H-5 is a standard impact basin drawing, Size C, completed for the 21" conduit. This figure is to be replaced with standard drawing ES-4070-040 when available.

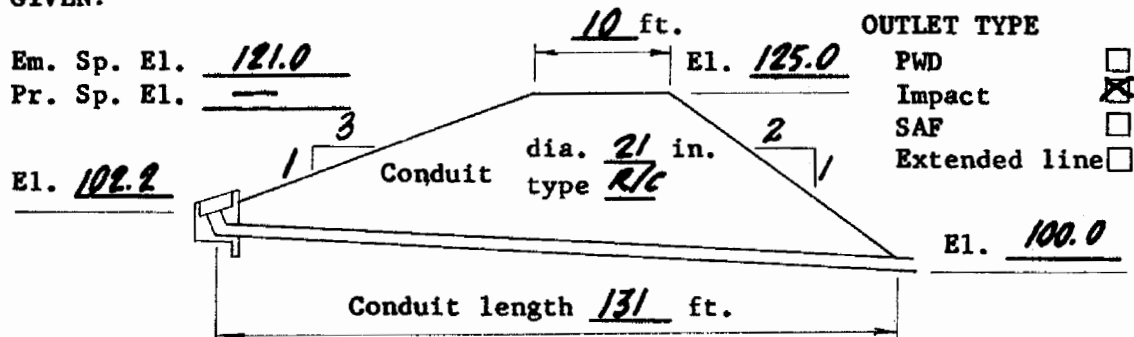
All of the example drawings were 21" x 30" reduced to their present size.

To complete the construction drawings for the appurtenances, an embankment profile through the conduit will be required. The relative positions of the appurtenances should be shown on this profile usually located on the same sheet as the plan of the dam (not included in this example).



STATE <u>FAR WEST</u>		PROJECT <u>Aldam Reservoir</u>			H-5
BY <u>HWF</u>	DATE <u>7-15-68</u>	CHECKED BY <u>FKM</u>	DATE <u>7-16-68</u>	JOB NO.	
SUBJECT <u>GATED OUTLET APPURTENANCES SUMMARY SHT.</u>				SHEET <u>1</u> OF <u>4</u>	

GIVEN:



Critical design

H 20 ft

Q 40 cfs

Foundation soil type

φ — C —

Embankment soil type

φ — C —

SW	<u>CI</u>	GW
SP	<u>MI</u>	GP
SM	<u>CH</u>	GM
SC	<u>MH</u>	GC

SELECTED DETAILS:

INLET													
Fig. C-1	Conduit size Diameter <u>21</u> inches Gate Size <u>21</u> Class <u>20-0</u> Type back Flat <input type="checkbox"/> Spigot <input checked="" type="checkbox"/> Flange <input type="checkbox"/> Other <input type="checkbox"/>												
Fig. C-2	Std. Drawing No. 7-N-20465 A B C D E F G <u>(H)</u> I J												
Fig. C-2	Trash rack												
C-3	Longitudinal members <u>2" pipe</u> Cross bars size <table border="1" style="display: inline-table; vertical-align: top;"> <thead> <tr> <th></th> <th>Single</th> <th>Double</th> </tr> </thead> <tbody> <tr> <td>A</td> <td><u>4" x 3/8"</u></td> <td></td> </tr> <tr> <td>B</td> <td><u>419.5</u></td> <td></td> </tr> <tr> <td>Z</td> <td><u>4"</u></td> <td></td> </tr> </tbody> </table>		Single	Double	A	<u>4" x 3/8"</u>		B	<u>419.5</u>		Z	<u>4"</u>	
	Single	Double											
A	<u>4" x 3/8"</u>												
B	<u>419.5</u>												
Z	<u>4"</u>												
	Clip height												

STATE <b>FAR WEST</b>	PROJECT <b>Aldam Reservoir</b>	
BY <b>HWF</b>	DATE <b>1-15-68</b>	CHECKED BY <b>FRM</b> DATE <b>1-16-68</b>
SUBJECT <b>GATED OUTLET APPURTENANCES SUMMARY SHT.</b>		JOB NO. <b>SHEET 2 OF 4</b>

Fig. C-5	Rock protection	R	<u>4</u> in.
		D75	<u>9 1/2</u> in.
	Rock layer thickness		<u>14</u> in.
	Filter layer thickness		<u>5</u> in.
Fig. C-6	Vent pipe diameter		<u>2</u> in.

## CONTROL

	Type of control	Mechanical <input checked="" type="checkbox"/>	Compare Hydraulic <input type="checkbox"/>	Alternate <input type="checkbox"/>
Fig. D-1	Lift pedestal size	7-L-20544 A B <u>C</u> D E F		
	Lift Types	Handwheel diameter	<u>24</u> in.	
		Lift nut	cast iron <input type="checkbox"/>	
			bronze <input checked="" type="checkbox"/>	
		Ball bearing	no <input type="checkbox"/> yes <input checked="" type="checkbox"/>	
		15" geared crank ratio		
	Stem	Material	Bronze <input type="checkbox"/>	Stainless <input checked="" type="checkbox"/> CR <input checked="" type="checkbox"/>
		Diameter	<u>1 1/2</u> inches	
	Encasement	yes <input checked="" type="checkbox"/> no <input type="checkbox"/>		
Fig. D-6, 7, 8	Stem pedestals:	spacing	<u>16</u> ft	Number _____
	Gate stem guide type	channel <input checked="" type="checkbox"/>	welded <input type="checkbox"/>	cast <input type="checkbox"/>
	Hydraulic Control	Weight slide gate	_____ lbs. approx.	
Fig. D-23		Type cylinder mount	front <input type="checkbox"/>	rear <input type="checkbox"/>
Fig. D-21		"L"	_____ inches approx.	
		"S"	_____ inches approx.	
		Cylinder bore diameter	_____ inches	
		rod type	standard <input type="checkbox"/>	oversize <input type="checkbox"/>
		Operation pressure	_____ psi	
		Reservoir capacity	_____ cubic inch	
		Tubing diameter	_____ inches	
Fig. D-24		Power operator	no <input type="checkbox"/> yes <input type="checkbox"/>	
	Control housing	type _____	location _____	



STATE <b>FAR WEST</b>		PROJECT <b>Aldam Reservoir</b>		H-7
BY <b>HWF</b>	DATE <b>7-15-68</b>	CHECKED BY <b>PKM</b>	DATE <b>7-16-68</b>	JOB NO.
SUBJECT <b>GATED OUTLET APPURTENANCES SUMMARY SHT.</b>				SHEET <b>3</b> OF <b>4</b>

### CONDUIT

Fig. E-2

Conduit type: Metal gage \_\_\_\_\_

R/C monolithic ☐  
t \_\_\_\_\_ inches  
rebar trans. \_\_\_\_\_ long. \_\_\_\_\_

Precast AWWA C300 ☐  
AWWA C301 ☐  
AWWA C302 ☒  
other \_\_\_\_\_

Fig. E-8

Anti-seep collars, increase in creep length % 15 ☐ 20 ☐

L 131 L' 111 v 2.0' Other \_\_\_\_\_

Number of collars 6

### OUTLET

Fig. E-12

Outlet type: SAF ☐

Cantilever ☐  
Bent Concrete ☐  
Steel & timber ☐  
Pool Earth ☐  
Armored ☐

Fig. F-2

Impact basin ES 4070

Fig. F-1

PWD size 7-E-20463 A B C D E F G H

Standard ☐ Modified 1 ☐ 2 ☐

Other \_\_\_\_\_

### MISCELLANEOUS STRUCTURES

Fig. G-1

Water level gage: Timber ☐  
Steel ☐

Fig. G-2

Intake strainer ☐

Fig. G-3

Timber catwalk ☐

Other \_\_\_\_\_

H-8	STATE <b>FAR WEST</b>	PROJECT <b>Aldam Reservoir</b>		
BY <b>HWF</b>	DATE <b>1-15-68</b>	CHECKED BY <b>FRM</b>	DATE <b>1-16-68</b>	JOB NO.
SUBJECT <b>GATED OUTLET APPURTENANCES SUMMARY SHT.</b>				SHEET <b>4</b> OF <b>4</b>

DRAWING LAYOUT

Drawing size:

Full ☐

Reduced ☒

REMARKS

1. *Soils classification by field identification.*
2. *The gate will have machined cast iron seating surfaces and a circular opening.*
3. *In addition to the std. title block and Litho stickers, the following approval blocks will be required on all drawings.*

Department Of Conservation And Development,  
Division Of Flood Control

APPLICATION No. \_\_\_\_\_

APPROVED AS TO SAFETY:

DATE: \_\_\_\_\_

SUPERVISOR

"I am hereby submitting for approval this plan as an officer of the United States Government authorized to approve and submit such plans."

State Soil Conservation Engineer, Soil Conservation Service

*Select from Figures E-3, E-4*

### ANTI-SEEP COLLAR

*Select from Figures D-15,  
D-16, D-17*

### HANDWHEEL BRACKET OR BASE PLATE

### STEEL SCHEDULE

*R/C Conduit and Collar  
Gate Stem Pedestal  
Gate Lift Pedestal*

*Select from Figures C-2, C-3*

### TRASH RACK DETAILS

*Select from Figures D-3, D-4*

ENCASED  
UNENCASED

### STEEL LAYOUT

*See  
Fig. D-5*

### STRUCTURAL LAYOUT

*See  
Fig. D-5*

*Select from  
sizes A thru E  
See Figures  
D-10 thru D-14*

*Select from Figures D-6, D-7, D-8*

### STATE APPROVAL BLOCK

### TITLE BLOCK

### GATE STEM PEDESTAL

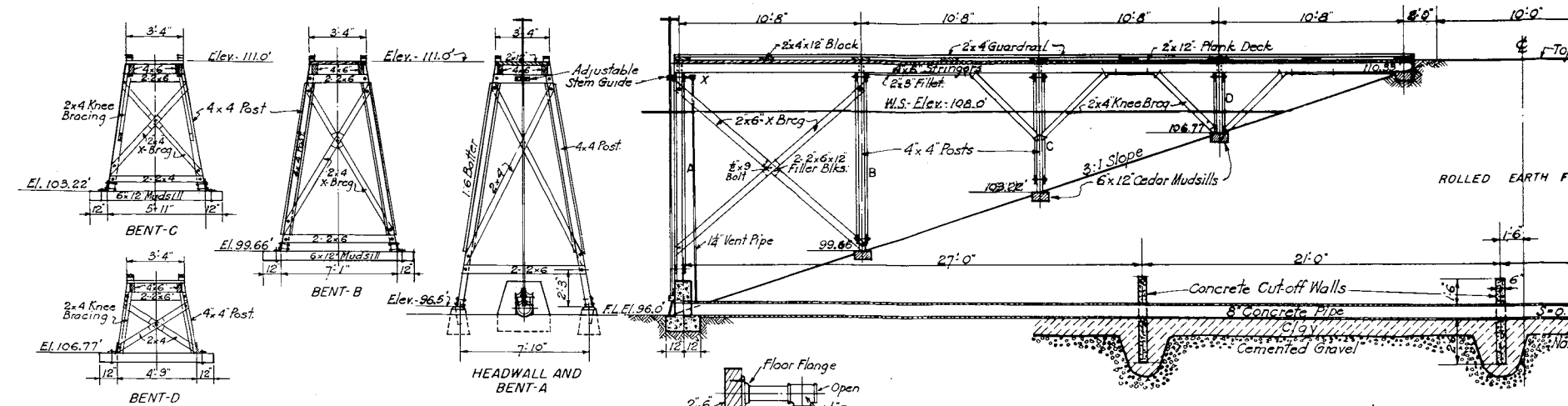
### GATE LIFT PEDESTAL

### GATE STEM GUIDE

FIGURE H-1  
TYPICAL LAYOUT  
STRUCTURAL DETAILS  
EWP Unit Portland, Oregon

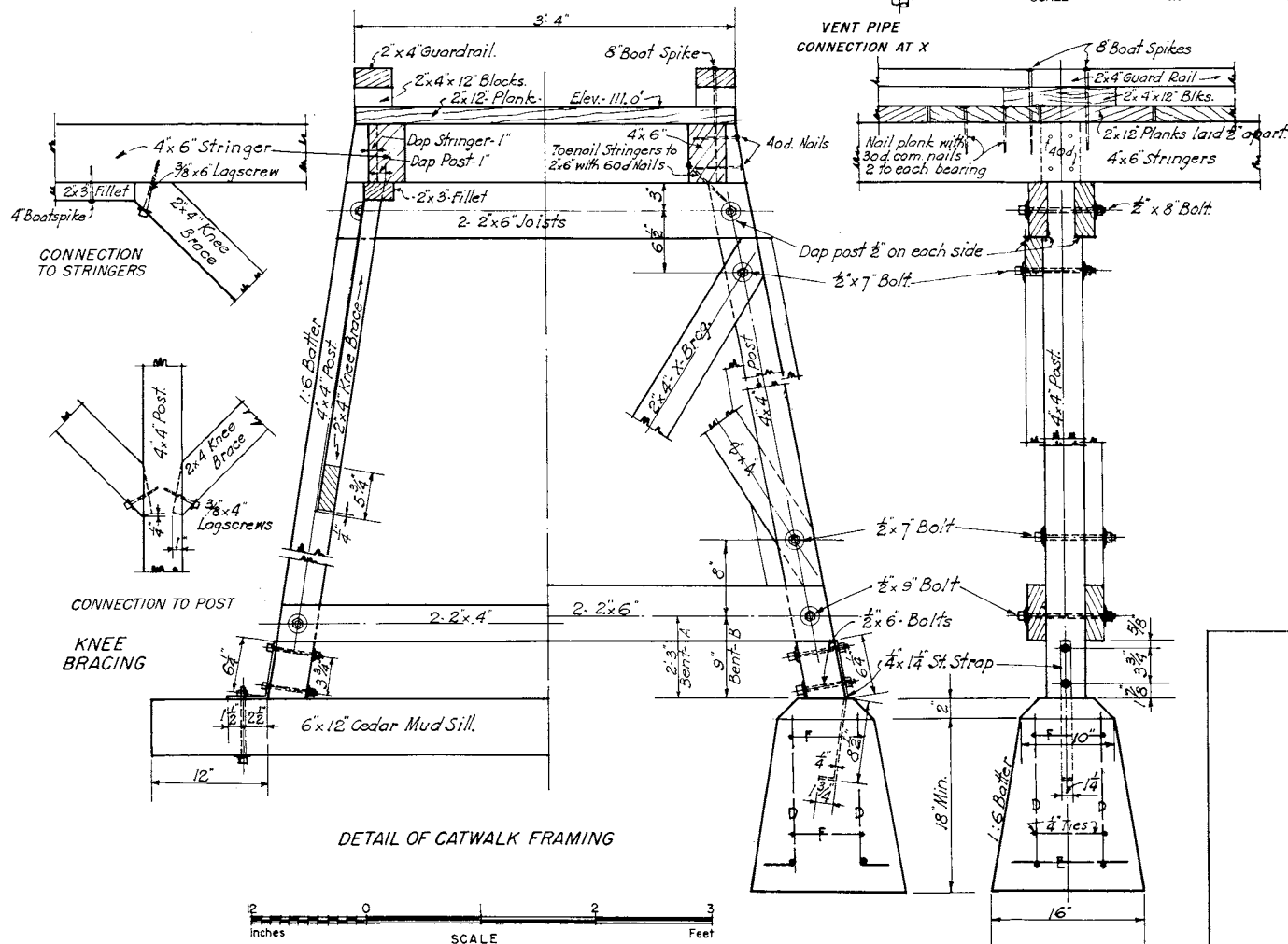
# STEEL SCHEDULE

Gate Stem  
Inlet



SECTION THRU DAM ON  $\phi$  OF PIPE

SCALE 0 5 10 15  
IN FEET



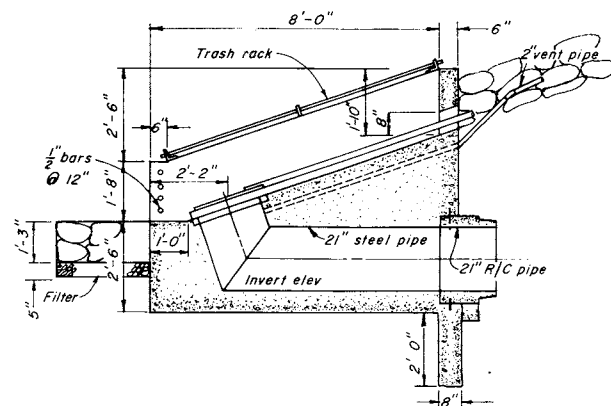
INLET STRUCTURE

STATE APPROVAL  
BLOCK

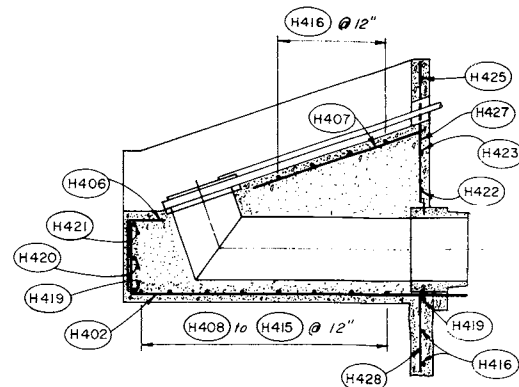
TITLE BLOCK

GATE STEM GUIDE

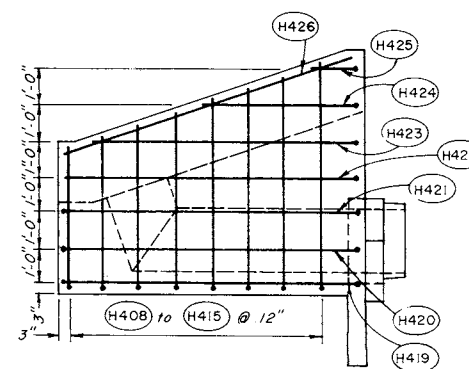
FIGURE H-2  
TYPICAL LAYOUT  
STRUCTURAL DETAILS  
EWP Unit Portland, Oregon



SECTIONAL ELEVATION

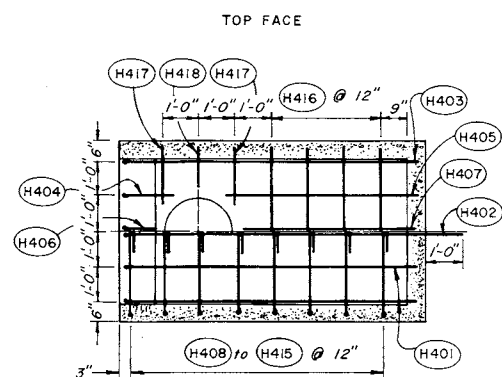


SECTIONAL ELEVATION



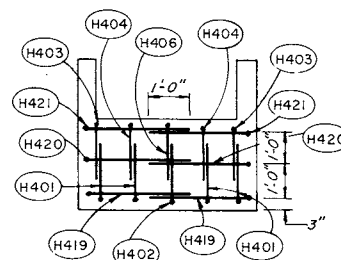
SECTIONAL ELEVATION

STEEL SCHEDULE										
Location	Size	Mark	Type	Length	Quan.	A	B	C	Total Length	
Slab	4	H401	2	10'-0"	4	2'-0"	8'-0"		40'-0"	
"	4	H402	2	11'-3"	1	2'-0"	9'-3"		11'-3"	
"	4	H403	SP	10'-3"	2	2'-0"	0'-9"	7'-6"	20'-6"	
"	4	H404	2	3'-3"	2	2'-0"	1'-3"		6'-6"	
"	4	H405	Str	5'-6"	2	2'-0"	0'-9"		11'-0"	
"	4	H406	2	2'-9"	1	2'-0"	0'-9"		2'-9"	
"	4	H407	Str	5'-0"	1	2'-9"	3'-9"		5'-0"	
"	4	H408	2	6'-6"	2	2'-9"	4'-0"		13'-0"	
"	4	H409	2	6'-9"	2	2'-9"	4'-0"		13'-6"	
"	4	H410	2	7'-0"	2	2'-9"	4'-3"		14'-0"	
"	4	H411	2	7'-3"	2	2'-9"	4'-6"		14'-6"	
"	4	H412	2	7'-9"	2	2'-9"	5'-0"		15'-6"	
"	4	H413	2	8'-0"	2	2'-9"	5'-3"		16'-0"	
"	4	H414	2	8'-3"	2	2'-9"	5'-6"		16'-6"	
"	4	H415	2	8'-9"	2	2'-9"	6'-0"		17'-6"	
"	4	H416	Str	4'-6"	6				27'-0"	
"	4	H417	Str	1'-6"	4				6'-0"	
"	4	H418	Str	1'-0"	2				2'-0"	
Sidewall	4	H419	2	13'-6"	2	2'-9"	8'-0"	2'-9"	27'-0"	
"	4	H420	2	11'-9"	2	2'-9"	8'-0"	1'-0"	23'-6"	
"	4	H421	2	12'-0"	2	2'-9"	8'-0"	1'-3"	24'-0"	
"	4	H422	2	10'-9"	2	2'-9"	8'-0"		21'-6"	
"	4	H423	2	10'-0"	2	2'-9"	7'-3"		20'-0"	
"	4	H424	2	6'-0"	2	2'-0"	4'-0"		12'-0"	
"	4	H425	2	6'-6"	1	1'-0"	4'-6"	1'-0"	6'-6"	
Headwall	4	H426	Str	8'-3"	6				49'-6"	
"	4	H427	Str	3'-9"	2				7'-6"	
"	4	H428	Str	2'-0"	2				4'-0"	

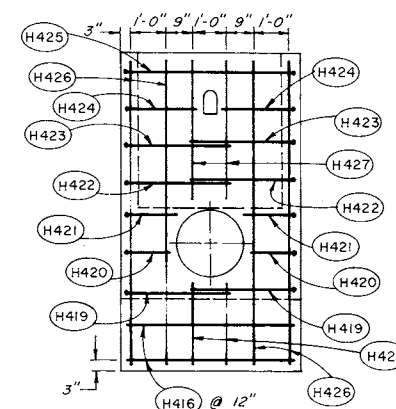


BOTTOM FACE

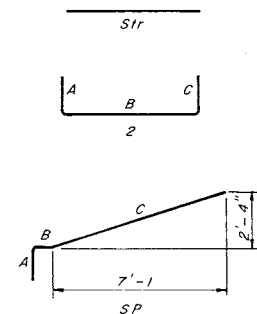
PLAN



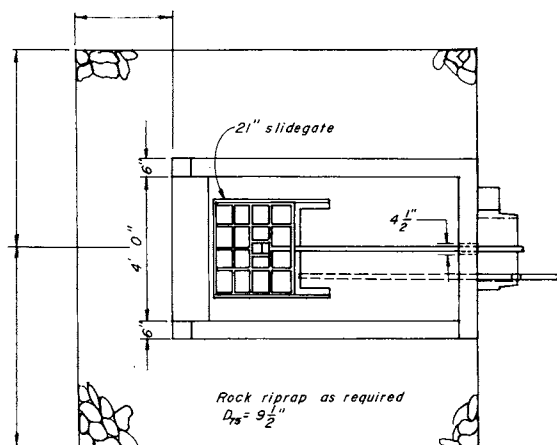
UPSTREAM ELEVATION



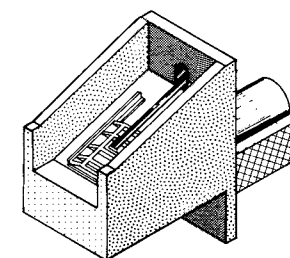
DOWNSTREAM ELEVATION



BAR TYPES



PLAN



ISOMETRIC VIEW

"I am hereby submitting for approval this plan as an officer of the United States Government authorized to approve and submit such plans."

State Soil Conservation Engineer, Soil Conservation Service

Department Of Conservation And Development,  
Division Of Flood Control

APPLICATION No. \_\_\_\_\_  
APPROVED AS TO SAFETY:  
DATE: \_\_\_\_\_

SUPERVISOR

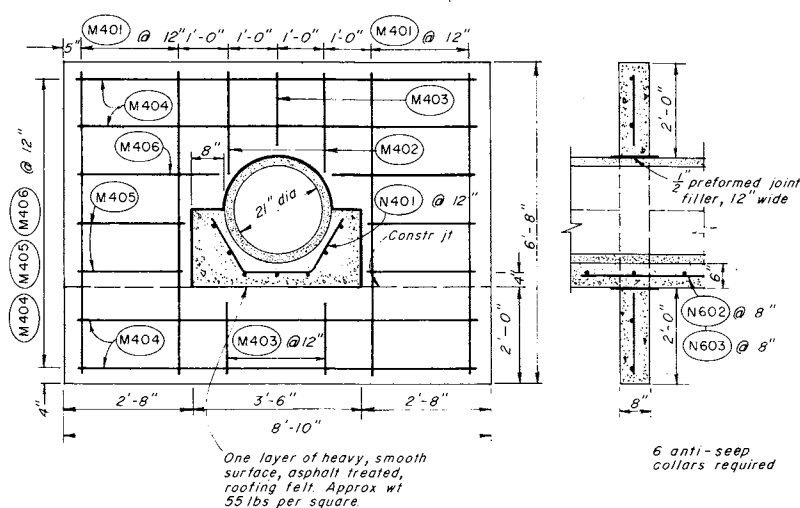
INLET STRUCTURE SIZE H  
PORTLAND OREGON E&W UNIT

INLET STRUCTURE  
**ALDAM RESERVOIR**  
HOOD S.C.D.  
TOYA COUNTY, OREGON

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

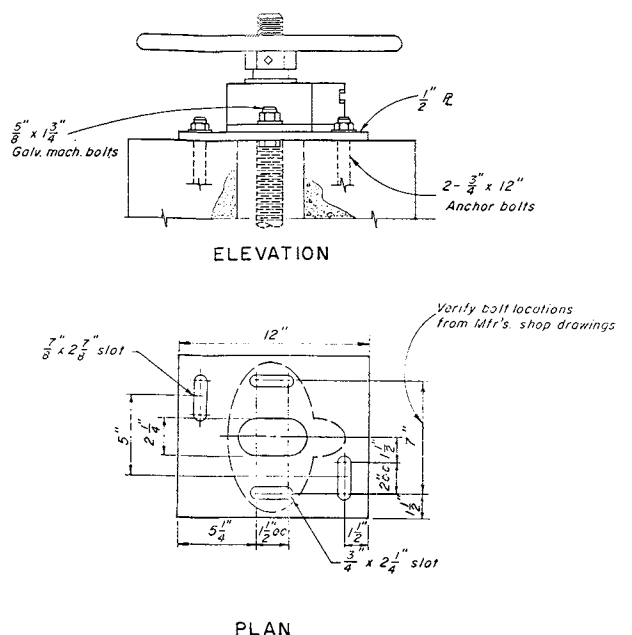
Designed H.W.F.  
Drawn L.L.K.  
Traced \_\_\_\_\_  
Checked F.K.M.

FIGURE H-3  
**INLET STRUCTURE**  
EWP Unit Portland, Oregon

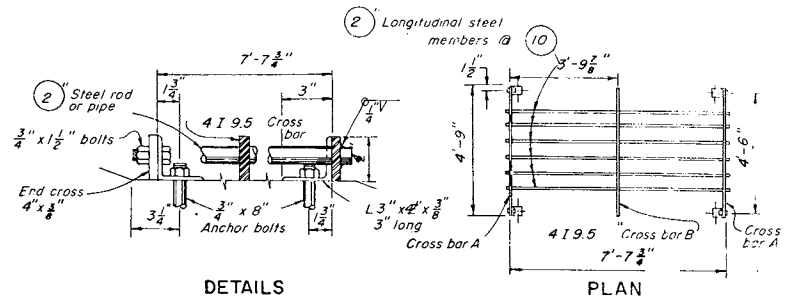


ELEVATION  
ANTI-SEEP COLLAR  
SCALE 0 5 FEET

SECTION

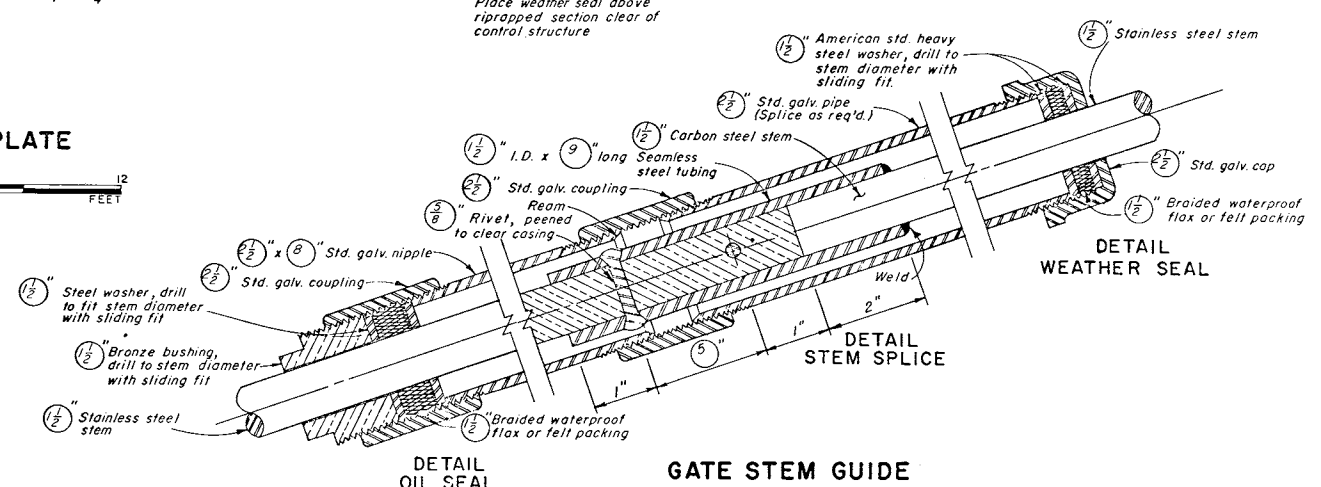


BASE PLATE  
SCALE 0 12 FEET

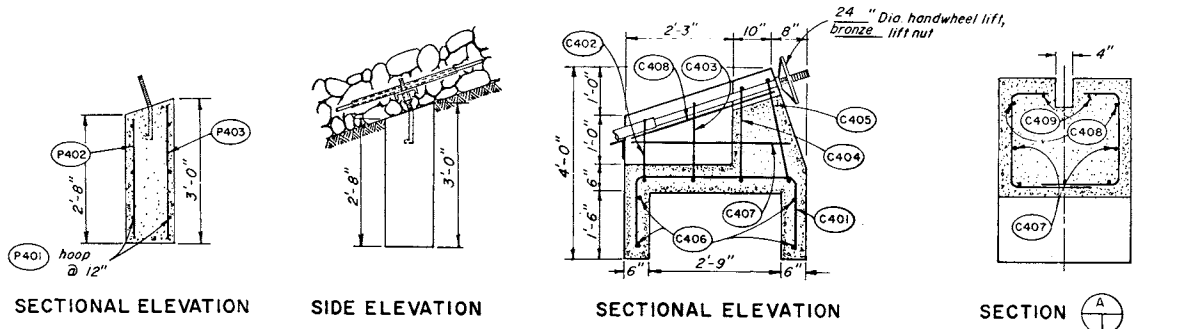


DETAILS  
TRASH RACK  
Not to Scale

PLAN



GATE STEM GUIDE  
Not to Scale

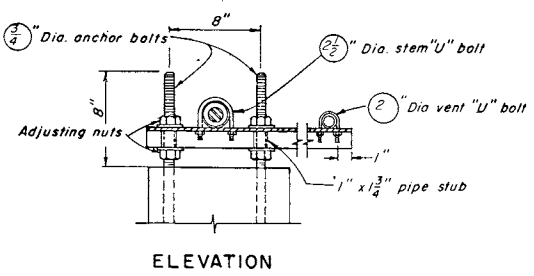


SECTIONAL ELEVATION

SIDE ELEVATION

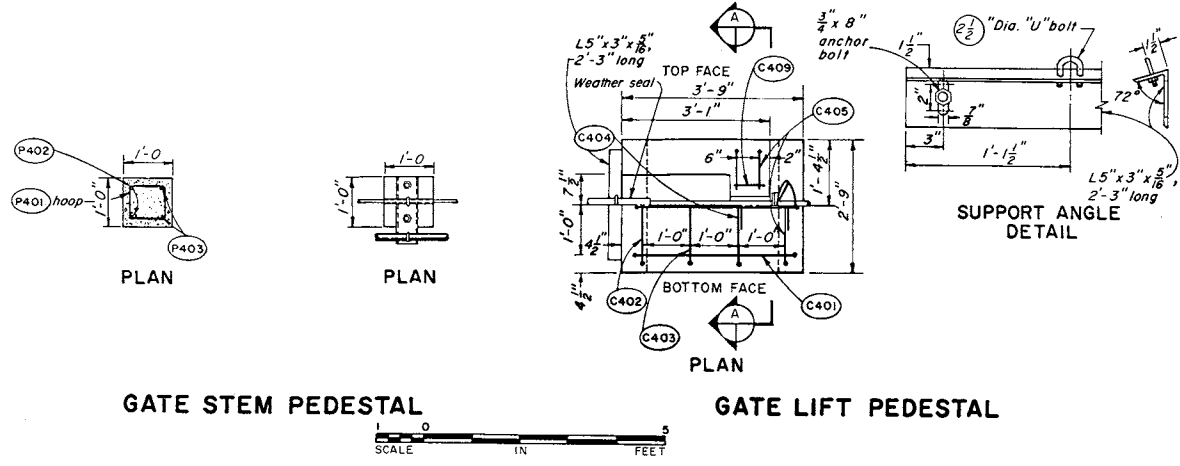
SECTIONAL ELEVATION

SECTION



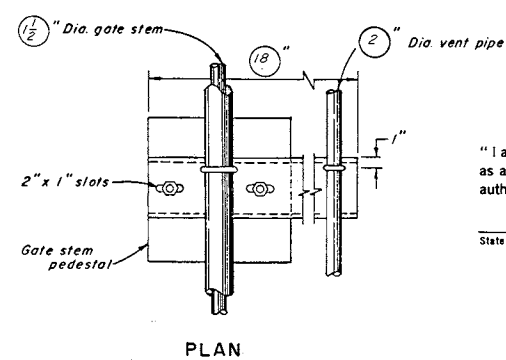
ELEVATION

SIDE VIEW



GATE STEM PEDESTAL  
SCALE 0 5 FEET

GATE LIFT PEDESTAL



PLAN

GATE STEM SPLICE  
Not to Scale

STEEL SCHEDULE										
Size	Mark	Type	Length	Quan	A	B	C	Total Length		
T PEDESTAL										
4	C401	2	6'-3"	3	1'-6"	3'-6"	1'-3"	18'-9"		
4	C402	2	4'-6"	1	1'-2"	2'-2"	1'-2"	4'-6"		
4	C403	2	5'-0"	1	1'-5"	2'-2"	1'-5"	5'-0"		
4	C404	2	4'-0"	2	1'-6"	1'-9"	0'-9"	8'-0"		
4	C405	2	4'-3"	2	1'-6"	2'-0"	0'-9"	8'-6"		
4	C406	Str	2'-3"	4				9'-0"		
4	C407	Str	3'-0"	2				6'-0"		
4	C408	Str	2'-9"	2				5'-6"		
4	C409	Str	0'-6"	2				1'-0"		
M PEDESTAL										
4	P401	Hoop	3'-0"	12				36'-0"		
4	P402	Str	2'-4"	8				18'-8"		
4	P403	Str	2'-8"	8				10'-8"		
P COLLAR & CRADLE										
4	M401	Str	6'-3"	36				225'-0"		
4	M402	Str	2'-3"	12				27'-0"		
4	M403	Str	1'-6"	24				36'-0"		
4	M404	Str	8'-6"	24				204'-0"		
4	M405	Str	2'-3"	24				54'-0"		
4	M406	Str	3'-0"	12				36'-0"		
4	N401	SPB	4'-0"	132	1'-4"	1'-4"	1'-4"	528'-0"		
6	N602	Str	20'-0"	49				980'-0"		
6	N603	Str	6'-0"	7				42'-0"		

Department Of Conservation And Development,  
Division Of Flood Control

APPLICATION No. \_\_\_\_\_  
APPROVED AS TO SAFETY:  
DATE: \_\_\_\_\_

STRUCTURAL DETAILS  
**ALDAM RESERVOIR**  
HOOD SCD.  
TOYA COUNTY, OREGON

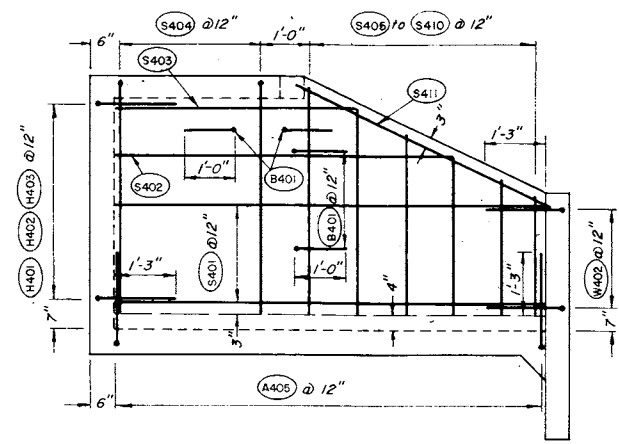
U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

FIGURE H-4  
**STRUCTURAL DETAILS**  
EWP Unit Portland, Oregon

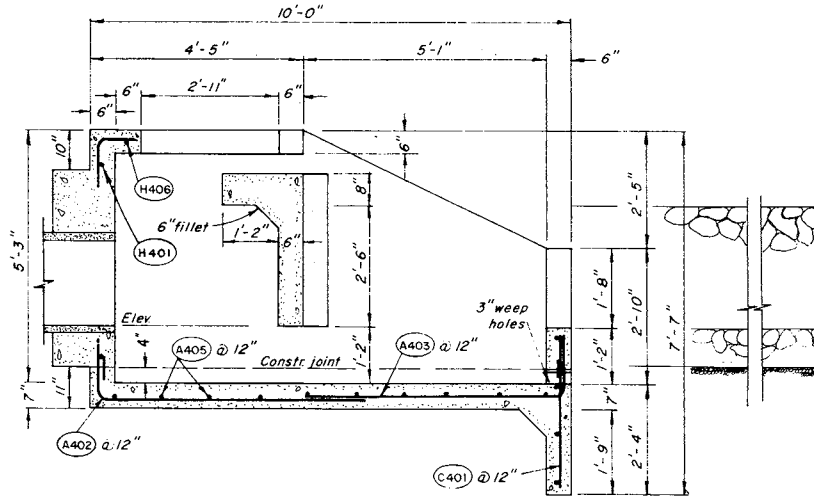
Designed: HWE  
Drawn: L.L.K.  
Traced: \_\_\_\_\_  
Checked: F.K.M.

"I am hereby submitting for approval this plan as an officer of the United States Government authorized to approve and submit such plans."

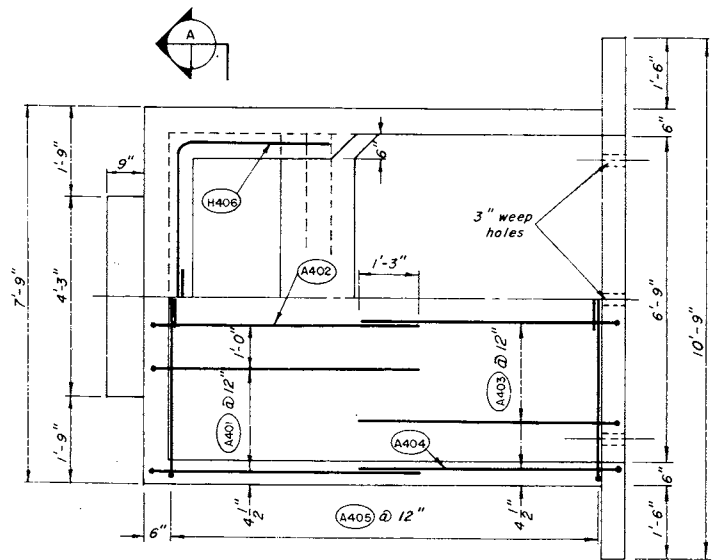
State Soil Conservation Engineer, Soil Conservation Service



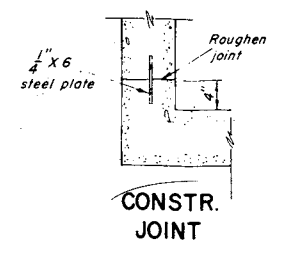
SIDEWALL ELEVATION



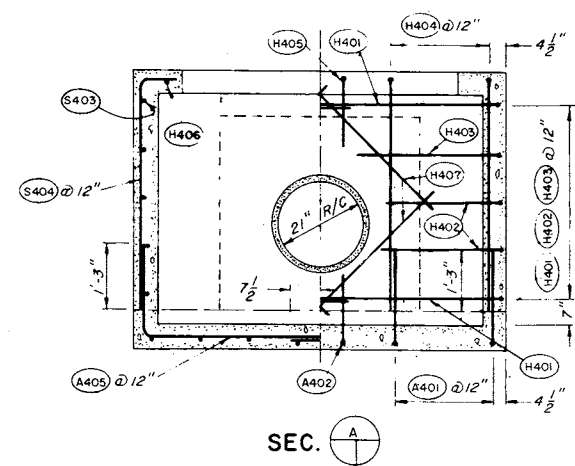
SECTIONAL ELEVATION



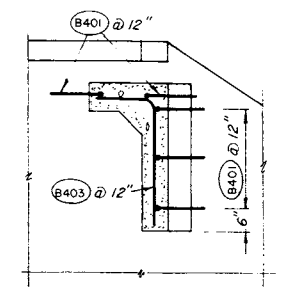
PLAN



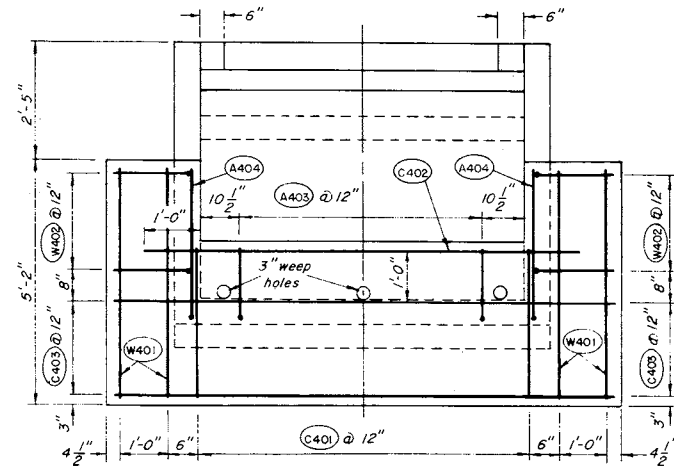
CONSTR. JOINT



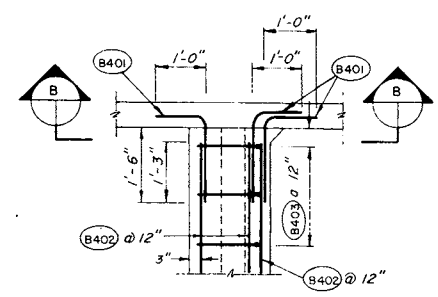
SEC. A



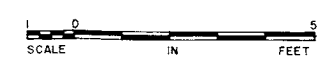
SEC. B



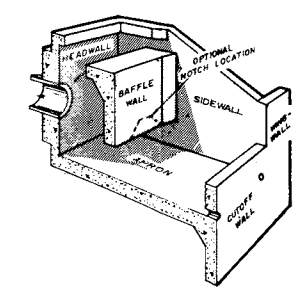
WINGWALL ELEVATION



BAFFLE WALL



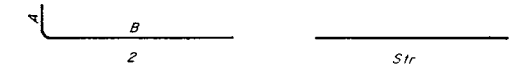
TO BE REPLACED BY  
DRWG NO ES 4070-040  
SEE FIG F-2



HALF PERSPECTIVE VIEW

STEEL SCHEDULE

LOCATION	MARK	SIZE	TYPE	LENGTH	QUAN.	A	B	TOTAL LENGTH
Apron	A401	4	2	7'-0"	6	1'-9"	5'-3"	42'-0"
"	A402	4	2	6'-6"	2	1'-3"	5'-3"	13'-0"
"	A403	4	2	6'-6"	2	1'-3"	5'-3"	39'-0"
"	A404	4	2	8'-3"	2	3'-0"	5'-3"	16'-6"
"	A405	4	2	6'-0"	20	1'-9"	4'-3"	120'-0"
Cutoff Wall	C401	4	Str	3'-9"	8			30'-0"
"	C402	4	Str	8'-9"	1			8'-9"
"	C403	4	Str	10'-3"	3			30'-9"
Wingwall	W401	4	Str	4'-9"	4			19'-0"
"	W402	4	2	5'-9"	6	1'-3"	1'-6"	16'-6"
Sidewall	S401	4	Str	9'-0"	6			54'-0"
"	S402	4	Str	7'-0"	2			14'-0"
"	S403	4	Str	5'-0"	2			10'-0"
"	S404	4	2	5'-6"	8	0'-9"	4'-9"	44'-0"
"	S405	4	Str	4'-9"	2			9'-6"
"	S406	4	Str	4'-3"	2			8'-6"
"	S407	4	Str	3'-9"	2			7'-6"
"	S408	4	Str	3'-3"	2			6'-6"
"	S409	4	Str	2'-9"	2			5'-6"
"	S410	4	Str	2'-3"	2			4'-6"
"	S411	4	Str	6'-0"	2			12'-0"
Headwall	H401	4	2	5'-6"	4	1'-3"	4'-3"	22'-0"
"	H402	4	2	3'-6"	4	1'-3"	2'-3"	14'-0"
"	H403	4	2	4'-3"	2	1'-3"	3'-0"	8'-6"
"	H404	4	2	5'-3"	6	0'-6"	4'-9"	31'-6"
"	H405	4	2	1'-9"	2	0'-6"	1'-3"	3'-6"
"	H406	4	2	6'-9"	2	3'-9"	3'-0"	13'-6"
"	H407	4	Str	3'-6"	4			14'-0"
Baffle Wall	B401	4	2	2'-6"	10	1'-0"	1'-6"	25'-0"
"	B402	4	Str	6'-3"	5			31'-3"
"	B403	4	2	4'-0"	7	1'-3"	2'-9"	28'-0"



BAR TYPES

"I am hereby submitting for approval this plan as an officer of the United States Government authorized to approve and submit such plans."

State Soil Conservation Engineer, Soil Conservation Service

Department Of Conservation And Development,  
Division Of Flood Control  
APPLICATION No. \_\_\_\_\_  
APPROVED AS TO SAFETY:  
DATE: \_\_\_\_\_  
SUPERVISOR

IMPACT BASIN SIZE C  
PORTLAND, OREGON E & WP UNIT

OUTLET DETAILS  
**ALDAM RESERVOIR**  
HOOD S.C.D.  
TOYA COUNTY, OREGON

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

Designed: H.W.F.  
Drawn: L.L.K.  
Traced: \_\_\_\_\_  
Checked: F.K.M.

FIGURE H-5  
**IMPACT BASIN**  
EWP Unit Portland, Oregon

TABLE OF QUANTITIES	
Concrete	cu. yd.
Reinforcing steel	lbs